

What is the GREET Fleet Footprint Calculator?

As early adopters of new vehicle technologies, fleets are vital to the success of alternative fuels and advanced vehicles (AFVs). The Greenhouse gases, Regulated Emissions, and Energy use in Transportation (GREET) Fleet Footprint Calculator can help fleets decide on the AFVs that will best help them meet a variety of organizational goals and legal requirements, including reducing their petroleum use and greenhouse gas (GHG) emissions.

Currently, the United States imports nearly half of its oil.¹ Because the United States uses about 70% of its oil for transportation, decreasing petroleum consumption in vehicles can substantially contribute to our country's energy independence.² Similarly, transportation accounts for nearly 33% of the carbon dioxide (CO₂) emissions the United States produces.³ Having the right information to understand the petroleum reduction and GHG benefits of different AFVs can help fleet managers make informed vehicle acquisition decisions.

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To help fleet managers buy vehicles that meet their needs, the U.S. Department of Energy's Clean Cities program supports Argonne National Laboratory's development of the GREET Fleet Footprint Calculator: greet.es.anl.gov/fleet_footprint_calculator. This tool estimates the petroleum and GHG footprints of medium- and heavy-duty vehicles and off-road equipment. The tool draws its data from the GREET fuel-cycle model. This model calculates petroleum use and GHG emissions of key fuel production pathways and combustion fuel types. GREET Fleet currently incorporates 12 fuel/vehicle combinations, including:

¹ http://www.eia.doe.gov/energyexplained/index.cfm?page=oil_imports

² http://cta.ornl.gov/data/teb31/Edition31_Chapter01.pdf

³ http://cta.ornl.gov/data/teb31/Edition31_Chapter11.pdf



The GREET Fleet Calculator can estimate petroleum and carbon footprints of both on-road vehicles and off-road equipment.

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Department of Energy Bus – Ron Walli, Communications and Media Relations
Hydrogen Forklift – NREL

- Gasoline
- Diesel and diesel hybrid
- Biofuels (biodiesel and ethanol)
- Electricity
- Gaseous fuels (compressed natural gas, liquefied natural gas, landfill gas, propane, and hydrogen).

The tool is updated with new fuel/vehicle types as they are updated in the GREET model. The tool is also available on the Alternative Fuels Data Center's Tools Page:

afdc.energy.gov/tools.

Although it is complex to account for all the activities that use petroleum and produce GHG emissions in vehicles, GREET Fleet is easy to use. Users can quickly enter their data to generate petroleum use and GHG emissions on a well-to-wheels basis. Well-to-wheels comparisons allow fleet managers to evaluate various alternatives, as activities upstream of vehicle operation can use significant amounts of energy and produce substantial emissions. For example, although electric vehicles produce no tailpipe emissions, generating electricity to power them can produce a considerable amount of emissions.

A well-to-wheels analysis has two stages: well-to-pump and pump-to-wheels. The well-to-pump stage begins with the recovery of the fuel's feedstock followed by fuel production, and ends with the fuel available at the pump. The pump-to-wheels stage simply represents the vehicle's operation.

After downloading the tool, which is in a standard Excel spreadsheet, fleet managers can compare vehicles.

First, enter the number of each type of vehicle to be purchased.

	Gasoline	Diesel	Diesel HEV	Biodiesel (B20)	Ethanol (E85)	Compressed Natural Gas (CNG)	Liquified Petroleum Gas / Propane (LPG)
School Bus	0	12	12	12	0	12	12
Transit Bus	0	0	0	0	0	0	0
Shuttle/Paratransit Bus	0	0	0	0	0	0	0
Waste Hauler	0	0	0	0	0	0	0
Street Sweeper	0	0	0	0	0	0	0
Delivery Step Van	0	0	0	0	0	0	0
Transport/Freight Truck	0	0	0	0	0	0	0
Medium/Heavy Duty Pickup Truck	0	0	0	0	0	0	0
Maintenance Utility Vehicle	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0

In this example, the fleet is considering running 12 conventional buses on diesel, 12 hybrid buses on diesel, 12 conventional buses on B20, 12 CNG buses, and 12 propane buses.

Second, enter the average annual miles traveled by each vehicle type.

	Gasoline	Diesel	Diesel HEV	B20	E85	CNG	LPG
School Bus	12,000	14,000	14,000	14,000	12,000	14,000	14,000
Transit Bus	30,000	30,000	30,000	30,000	30,000	30,000	30,000
Shuttle/Paratransit Bus	30,000	30,000	30,000	30,000	30,000	30,000	30,000
Waste Hauler	23,400	23,400	23,400	23,400	23,400	23,400	23,400
Street Sweeper	12,600	12,600	12,600	12,600	12,600	12,600	12,600
Delivery Step Van	16,500	16,500	16,500	16,500	16,500	16,500	16,500
Transport/Freight Truck	80,000	80,000	80,000	80,000	80,000	80,000	80,000
Medium/Heavy Duty Pickup Truck	11,400	11,400	11,400	11,400	11,400	11,400	11,400
Maintenance Utility Vehicle	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Other	30,000	30,000	30,000	30,000	30,000	30,000	30,000

GREET Fleet has default average annual miles traveled and fuel economy for each vehicle type. Users should update these inputs with their own data.

Third, enter the average fuel economy for each vehicle type (miles per gasoline gallon equivalent).

	Gasoline	Diesel	Diesel HEV	B20	E85	CNG	LPG
School Bus	6.0	7.0	8.5	7.0	6.0	6.0	6.0
Transit Bus	2.5	3.0	3.8	3.0	2.5	2.5	2.5
Shuttle/Paratransit Bus	7.0	8.0	10.0	8.0	7.0	7.0	7.0
Waste Hauler	2.0	2.5	3.0	2.5	2.0	2.0	2.0
Street Sweeper	3.0	4.0	5.0	4.0	3.0	3.0	3.0
Delivery Step Van	12.0	15.0	18.5	15.0	12.0	12.0	12.0
Transport/Freight Truck	5.0	6.0	7.5	6.0	5.0	5.0	5.0
Medium/Heavy Duty Pickup Truck	9.0	11.0	13.5	11.0	9.0	9.0	9.0
Maintenance Utility Vehicle	20.0	25.0	31.0	25.0	20.0	20.0	20.0
Other	2.5	3.0	3.8	3.0	2.5	2.5	2.5

Alternatively, a user can calculate an existing fleet’s footprint by only entering the fleet’s annual total fuel use (gallons, cubic feet, or kilowatt-hours).

	Gasoline (gallons)	Diesel (gallons)	Diesel HEV (gallons)	B20 (gallons)	E85 (gallons)	CNG (cubic feet)	LPG (gallons)
School Bus	0	21,286	17,530	21,618	0	3,271,300	37,854
Transit Bus	0	0	0	0	0	0	0
Shuttle/Paratransit Bus	0	0	0	0	0	0	0
Waste Hauler	0	0	0	0	0	0	0
Street Sweeper	0	0	0	0	0	0	0
Delivery Step Van	0	0	0	0	0	0	0
Transport/Freight Truck	0	0	0	0	0	0	0
Medium/Heavy Duty Pickup Truck	0	0	0	0	0	0	0
Maintenance Utility Vehicle	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
Gasoline Gallon Equivalent Total	0	24,000	19,765	24,000	0	28,000	28,000

Users can further refine their estimates by revising the assumptions about fuel production. Users can choose the type of ethanol (corn or cellulosic) for E85 vehicles or the electricity mix for electric vehicles.

After users enter this information, the tool calculates the results, which are broken down by fuel and vehicle.

Below are the results of on-road fleet's petroleum usage (barrels for this example).

	Gasoline	Diesel	Diesel HEV	B20	E85	CNG	LPG	Vehicle Total
School Bus	0.0	553.5	455.8	450.9	0.0	3.6	255.5	1,719.4
Transit Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shuttle/Paratransit Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Waste Hauler	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delivery Step Van	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transport/Freight Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medium/Heavy Duty Pickup Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maintenance Utility Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Total	0.0	553.5	455.8	450.9	0.0	3.6	255.5	

Below are the results of on-road fleet's greenhouse gas emissions (tons CO₂-equivalent for this example).

	Gasoline	Diesel	Diesel HEV	B20	E85	CNG	LPG	Vehicle Total
School Bus	0.0	301.4	248.2	256.4	0.0	281.0	290.2	1,377.1
Transit Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shuttle/Paratransit Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Waste Hauler	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Street Sweeper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delivery Step Van	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transport/Freight Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medium/Heavy Duty Pickup Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maintenance Utility Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Total	0.0	301.4	248.2	256.4	0.0	281.0	290.2	

GREET Fleet, available at greet.es.anl.gov/fleet_footprint_calculator, is a handy tool that simplifies the difficult task of estimating the petroleum use and GHG footprints of numerous conventional and alternative fuel vehicles. It can help fleets select the right fuel/vehicle combination for them, depending on the individual fleet's preferences. This tool is also useful for setting company goals or applying for financial assistance. This tool and more than 20 others from the U.S. Department of Energy's Clean Cities program are available at afdc.energy.gov/tools.